Name: Date:

Exam: Function Reflections (Solution version 11)

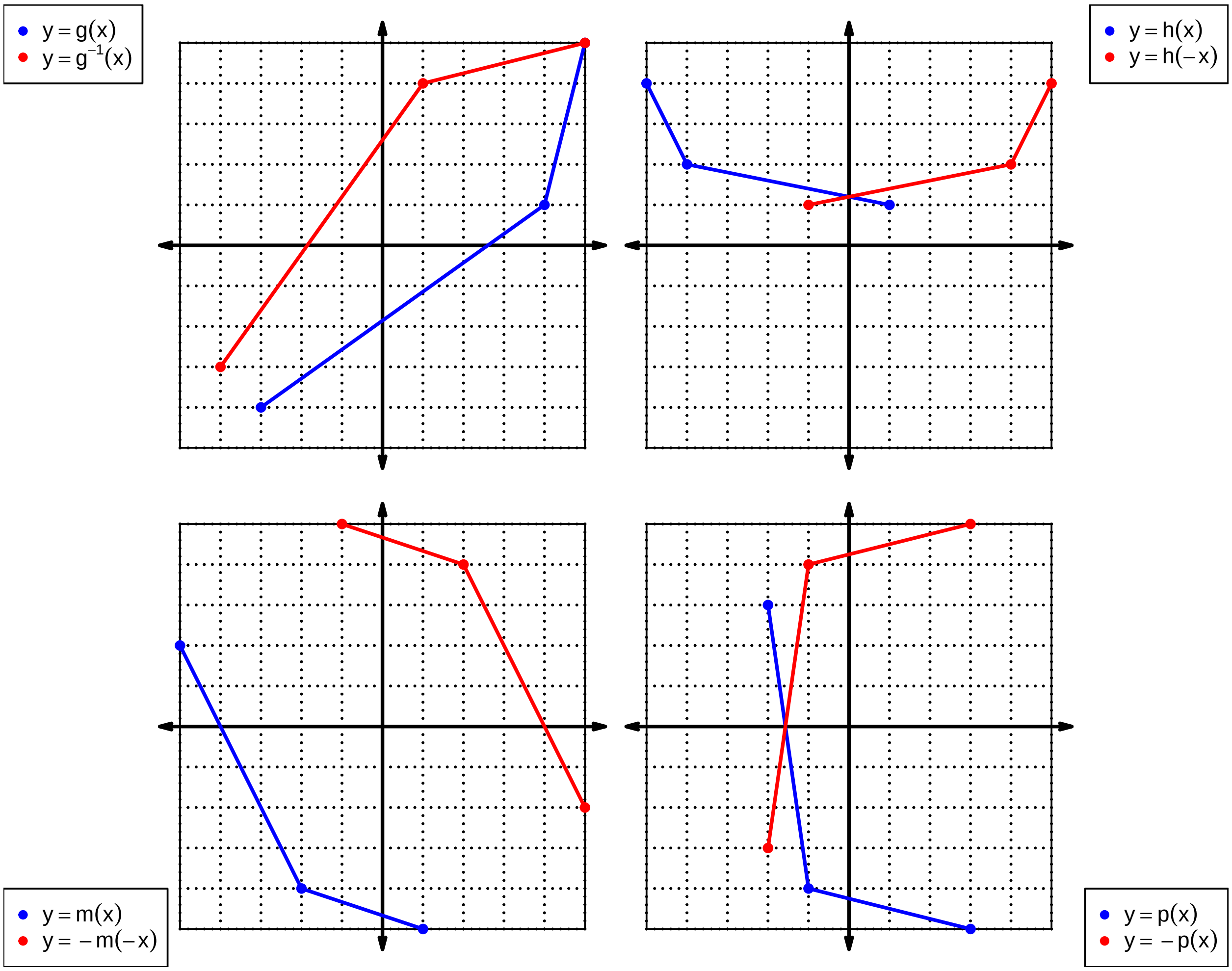
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; 3x^5 - 2x^4 + 8x^3 + 6x^2 + 5x - 9$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$-f(x)$	$-3x^5 - 2x^4 - 8x^3 + 6x^2 - 5x - 9$
$f(-x)$	$3x^5 + 2x^4 + 8x^3 - 6x^2 + 5x + 9$
$-f(-x)$	$-3x^5 + 2x^4 - 8x^3 - 6x^2 - 5x + 9$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	8	3	2
2	4	6	5
3	5	2	6
4	1	7	4
5	6	1	8
6	9	5	7
7	3	8	3
8	2	4	9
9	7	9	1

3. Evaluate $h(2)$.

$$h(2) = 5$$

4. Evaluate $g^{-1}(4)$.

$$g^{-1}(4) = 8$$

5. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-9)$?

If function g is odd, then

$$g(-9) = -9$$

6. By filling more rows of the table, it is possible to make function f **even**. If that were done, what would be the value of $f(-3)$?

If function f is even, then

$$f(-3) = 5$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \ = \ -x^2 + 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$\begin{aligned} p(-x) \ &= \ -(-x)^2 + 1 \\ p(-x) \ &= \ -x^2 + 1 \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$\begin{aligned} -p(-x) \ &= \ -\left(-x^2 + 1\right) \\ -p(-x) \ &= \ x^2 - 1 \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

   even

   d. Explain how you know the answer to part c.

   We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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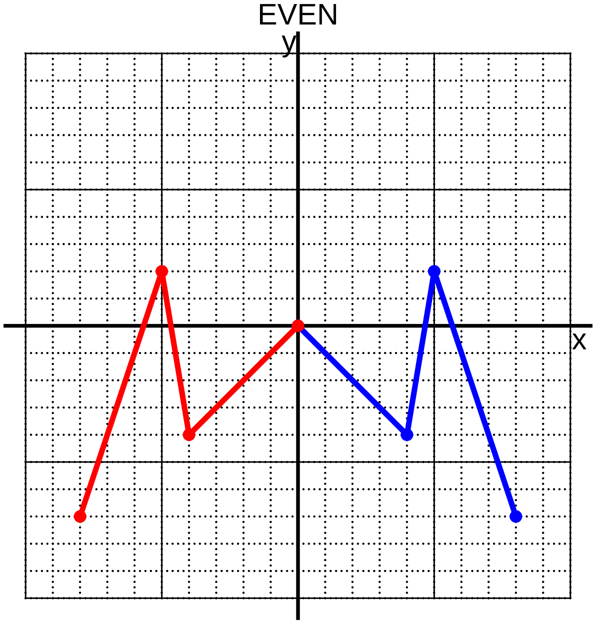
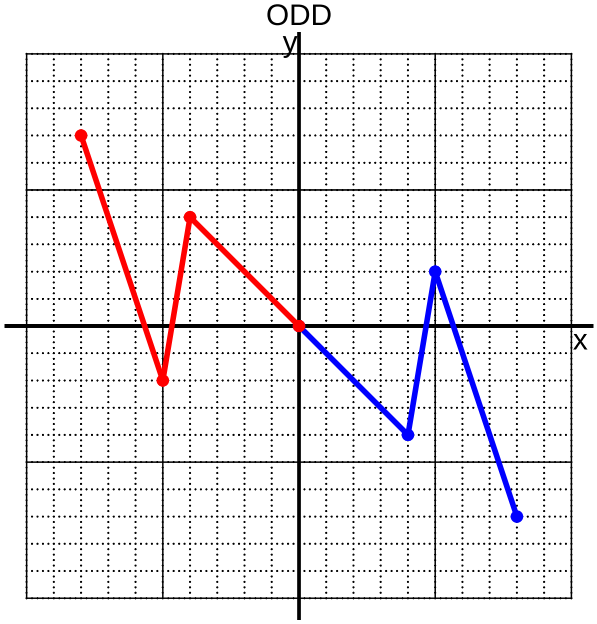
8. I have drawn half of a function. Draw the other half to make it even or odd.

EVEN



ODD



9. Let function f be defined with the equation below.

$$f(x) = \frac{x+8}{9}$$

a. Evaluate $f(91)$.

step 1: add 8
step 2: divide by 9

$$f(91) = \frac{(91)+8}{9}$$
$$f(91) = 11$$

b. Evaluate $f^{-1}(10)$.

step 1: multiply by 9
step 2: subtract 8

$$f^{-1}(x) = 9x - 8$$
$$f^{-1}(10) = 9(10) - 8$$
$$f^{-1}(10) = 82$$

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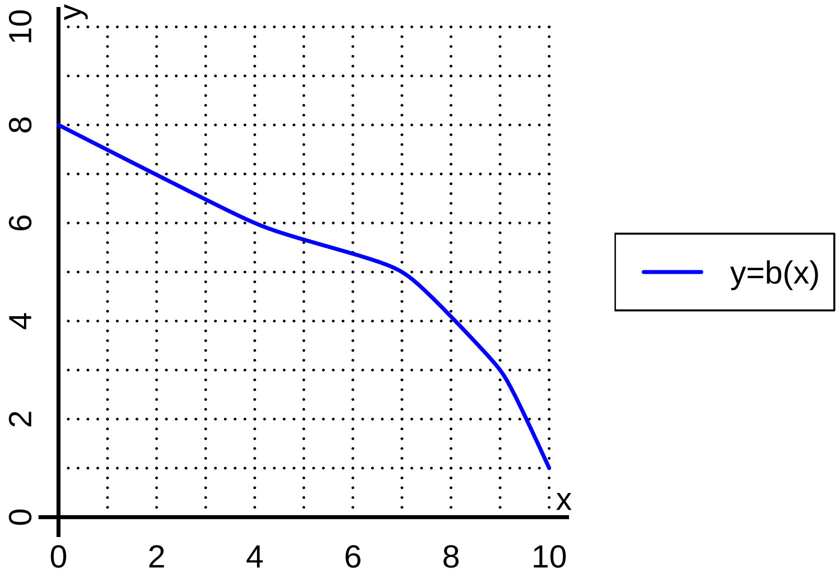
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(9)$.

$$b(9) \ = \ 3$$

b. Evaluate $b^{-1}(6)$.

$$b^{-1}(6) \ = \ 4$$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-6	6	6	-6
-1	-3	3	-3	3
0	0	0	0	0
1	-3	3	-3	3
2	6	-6	-6	6

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.